

SUPPORT

Claims 106 and 115 have been amended so that the intumescent flame retardant comprises an additional compound – ethylene diamine phosphate and/or ammonium polyphosphate.

Support that these compounds can be blended with the previously claimed melamine compounds can be found in the specification at page 9, lines 3 – 7.

ARUGMENTS

1. The Office Action rejected claims 106-114 under 35 USC 102(b) as anticipated by Zhu et al. US 6,090,316.

The currently amended independent claim 106 requires that the flame retardant also comprise ethylene diamine phosphate and/or ammonium polyphosphate. The rejection is overcome because neither of these compounds are found in Zhu, thus Zhu cannot anticipate the independent claim or its dependent claims.

2. The Office Action rejected claims 106-114 under 35 USC 102(b) as being anticipated by Lindsay, US No. 5,409,976.

The currently amended independent claim 106 requires that the flame retardant also comprise ethylene diamine phosphate and/or ammonium polyphosphate. The rejection is overcome because a blend of the specific claimed melamine compounds with a phosphorous source is not taught in Lindsay. While Lindsay teaches melamine phosphate, it does not teach adding a third phosphate source. Nor does Lindsay teach adding the claimed melamine compounds with ammonium polyphosphate or ethylene diamine phosphate.

While Lindsay teaches ammonium polyphosphate encapsulated by melamine formaldehyde, this cannot anticipate or render obvious the instantly claimed composition. First, melamine formaldehyde is not claimed. Second, melamine formaldehyde is encapsulating the ammonium polyphosphate (col 6, lines 6 – 10; and attached MSDS's for EXOLIT 462). Encapsulation is not a blend as instantly claimed. Therefore, Lindsay cannot anticipate the instantly claimed invention.

3. The Office Action rejected claims 115-117 under 35 USC 103(a) as being unpatentable over Zhu et al as applied to claims 106-114 and further in view of Lindsay et al. US No. 5,409,976.

The currently amended independent claim 115 requires that the flame retardant also comprise ethylene diamine phosphate and/or ammonium polyphosphate. As argued earlier, the flame

retardant compositions of Lindsay and Zhu do not disclose the listed melamine compounds blended with ethylene diamine phosphate and/or ammonium polyphosphate. The amendment to claims thus overcomes this rejection as well.

Since the amendment to claims overcomes the rejections a notice of allowance is respectfully requested. The Commissioner is authorized to deduct any fees or underpayments that remain or credit any overcharges to Deposit Account No. 50-3651.

Respectfully submitted,

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May 19, 2009



Product Data Sheet - Flame Retardants

Pigments & Additives Division

Exolit AP 462

Edition 04/02/2008

Ammonium Polyphosphate

Chem. Group: Ammonium Polyphosphate
Product-No.: 106961

Supply Form:

CAS-No.:

Product Description

Exolit AP 462 is a product based on ammonium polyphosphate. The crystal modification is phase II. It is manufactured from Exolit AP 422 by micro-encapsulation with melamine resin according to Clariant's own method.

Exolit AP 462 is a fine-particle white powder with very low solubility in water, even at elevated temperatures. It is completely insoluble in organic solvents. The product is non-hygroscopic and non-flammable. Exolit AP 462 differs from Exolit AP 422 in the following properties:

- marked reduction in water-soluble constituents
- even lower viscosity in aqueous suspension
- lower heat stability in the temperature range > 300 °C
- improved powder flowability

Delivery Specification and Technical Data

Characteristics	Unit	Target value	DS ¹⁾ TD ²⁾	Test method
Chemical Formula		[NH ₄ PO ₃] _n n > 1000	○ ☒	
Phosphorus	%(w/w)	29.0 - 31.0	○ ☒	
Water / Moisture	%(w/w)	max. 1.0	○ ☒	Thermogravimetry (IR-lamp) at 130 °C
Nitrogen	%(w/w)	15.0 - 17.0	○ ☒	
Density	g/cm ³	1.9	○ ☒	at 25 °C
Bulk Density	g/cm ³	approx. 0.9	○ ☒	
Viscosity	mPa*s	max. 20	○ ☒	at 25 °C in 10 % aqueous suspension
pH Value		6.5 - 8.5	○ ☒	10 % aqueous suspension
Solubility in Water	%(w/w)	max. 0.04	○ ☒	at 25 °C in 10 % suspension
Acid Number	mgKOH/g	max. 0.5	○ ☒	10 % aqueous suspension
Average Particle Size (D50)	µm	approx. 20	○ ☒	
Particle Size Distribution	%(w/w)		○ ☒	
	>100 µm	max. 0.2		
	< 50 µm	min. 80		
	-	-		
	-	-		
	-	-		

¹⁾ Delivery specification: The product is constantly monitored to ensure that it adheres to the specified values.

²⁾ Technical data: The technical data are used solely to describe the product and are not subject to regular monitoring.

Applications

Exolit AP 462 can be used for all applications ammonium polyphosphate is suitable for. In cases where a specific phosphorus content is required to obtain the desired effect, the lower phosphorus content of Exolit AP 462 should be compensated by increasing the amount of product added.

Exolit AP 462 can be used advantageously in intumescent coatings where the ammonium polyphosphate is required to have

extremely low water solubility and where lower heat stability at temperatures above 300 °C contributes to more rapid foaming of the coating.

Intumescent coatings

On account of its low water solubility, Exolit AP 462 is particularly suitable as an "acid donor" for intumescent coatings. Other essential components of intumescent systems include a binder, a carbon donor (e.g. pentaerythritol) and a blowing agent (e.g. melamine).

On exposure to flame, the intumescent coatings form a carbonaceous foam which effectively shields the underlying material from temperature increases.

Steel structures coated with intumescent paints can meet the requirements of fire resistance classes specified in EN, DIN, BS, ASTM and others.

The application of Exolit AP 462 based intumescent coatings on wood or plastics enables these materials to qualify for Building Material Class B (DIN EN 13501-1).

Exolit AP 462 imparts a good flame-retardant effect to adhesives and sealants when it is incorporated into the base formulation at the rate of 10 - 20 %.

Polyurethane foams

Exolit AP 462 is a suitable non-halogenated flame retardant for polyurethane foams. If handling of Exolit AP 462 as a solid is not possible we recommend the dosage of the flame retardant by preparing an Exolit AP 462/polyol-suspension. Because of the low acid number of Exolit AP 462 it is also possible to incorporate this flame retardant in an Exolit AP 462/isocyanate suspension. To prevent the solid from settling the Exolit AP 462 suspensions should be stirred or circulated by pump.

Other applications

Exolit AP 462 has an excellent flame-retardant effect in cellulose-containing materials such as paper and wood products. With chipboard products the B classification according to DIN EN 13501-1 can be achieved by adding 15 - 20 % Exolit AP 462. Casting resins based on epoxy resins or unsaturated polyester resins achieve the classification UL94-V0 with Exolit AP 462.

Safety and Handling

For regulatory details such as the classification and labeling as dangerous substances or goods please refer to our corresponding material safety data sheet.

Dispatch and Storage

GGVE/RID

GGVS/ADR

ADNR

IMDG-Code

UN Number

IATA-DGR

Packaging

Exolit AP 462 is packed in 40 x 25 kg-paper bags (polyethylene inliner) net per 1.000 kg-pallet, shrink-wrapped. Exolit AP 462 can also be supplied in a variety of big bags, shrink-wrapped.

For all specifications, deliveries and services the following
DISCLAIMER applies: [Disclaimer_E](#)

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